

## **SEQUENCE LISTING**

### **SEQ ID NO:1 Synthetic Sso7d gene**

GCAACCGTAAAGTTCAAGTACAAAGGCGAAGAAAAAGAGGTAGACATCTCCAA  
5 GATCAAGAAAGTATGGCGTGTGGGCAAGATGATCTCCTTCACCTACGACGAGGG  
CGGTGGCAAGACCGGCCGTGGTGCAGTAAGCGAAAAGGACGCGCCGAAGGAGC  
TGCTGCAGATGCTGGAGAAG  
CAGAAAAAG

### **10 SEQ ID NO:2 The amino acid sequence of Sso7d.**

ATVKFKYKGEEKEVDISKIKKVWRVGKMISFTYDEGGGKTGRGAVSEKDAPKELLQ  
MLEKQKK

### **SEQ ID NO:3 The DNA sequence encoding the Sso7d-ΔTaq fusion protein**

15 ATGATTACGAATTCGAGCGCAACCGTAAAGTTCAAGTACAAAGGCGAAGAAAAA  
GAGGTAGACATCTCCAAGATCAAGAAAGTATGGCGTGTGGGCAAGATGATCTCC  
TTCACCTACGACGAGGGCGGTGGCAAGACCGGCCGTGGTGCAGTAAGCGAAAAG  
GACGCGCCGAAGGAGCTGCTGCAGATGCTGGAGAAGCAGAAAAAGGGCGGCGG  
TGTCAGTAGTCCCAAGGCCTGGAGGAGGCCCCCTGGCCCCCGCCGGAAGGGGGCC  
20 TTCGTGGGCTTTGTGCTTTCCCGCAAGGAGCCCATGTGGGCCGATCTTCTGGCCCT  
GGCCGCGCCAGGGGGGGCCGGGTCCACCGGGCCCCCGAGCCTTATAAAGCCCT  
CAGGGACCTGAAGGAGGCGCGGGGGCTTCTCGCCAAAGACCTGAGCGTTCTGGC  
CCTGAGGGAAGGCCTTGGCCTCCCGCCCGGCGACGACCCCATGCTCCTCGCCTAC  
CTCCTGGACCCTTCCAACACCACCCCGAGGGGGTGGCCCGGCGCTACGGCGGG  
25 GAGTGGACGGAGGAGGCGGGGGAGCGGGCCGCCCTTTCGAGAGGCTCTTCGCC  
AACCTGTGGGGGAGGCTTGAGGGGGAGGAGAGGCTCCTTTGGCTTTACCGGGAG  
GTGGAGAGGCCCCTTTCGCTGTCCTGGCCACATGGAGGCCACGGGGGTGCGC  
CTGGACGTGGCCTATCTCAGGGCCTTGTCCTGGAGGTGGCCGAGGAGATCGCCC  
GCCTCGAGGCCGAGGTCTTCCGCCTGGCCGGCCACCCCTTCAACCTCAACTCCCG  
30 GGACCAGCTGGAAAGGGTCCTCTTTGACGAGCTAGGGCTTCCCGCCATCGGCAA  
GACGGAGAAGACCGGCAAGCGCTCCACCAGCGCCGCGTCCTGGAGGCCCTCCG  
CGAGGCCACCCCATCGTGGAGAAGATCCTGCAGTACCGGGAGCTACCAAGCT  
GAAGAGCACCTACATTGACCCCTTGCCGGACCTCATCCACCCAGGACGGGGCCG  
CCTCCACACCCGCTTCAACCAGACGGCCACGGCCACGGGCAGGCTAAGTAGCTC

CGATCCCAACCTCCAGAACATCCCCGTCCGCACCCCGCTTGGGCAGAGGATCCGC  
 CGGGCCTTCATCGCCGAGGAGGGGTGGCTATTGGTGGCCCTGGACTATAGCCAG  
 ATAGAGCTCAGGGTGCTGGCCACCTCTCCGGCGACGAGAACCTGATCCGGGTCT  
 TCCAGGAGGGGCGGGACATCCACACGGAGACCGCCAGCTGGATGTTTCGGCGTCC  
 5 CCCGGGAGGCCGTGGACCCCCTGATGCGCCGGGCGGCCAAGACCATCAACTTCG  
 GGGTCCTCTACGGCATGTCGGCCACCGCCTCTCCCAGGAGCTAGCCATCCCTTA  
 CGAGGAGGCCCAGGCCTTCATTGAGCGCTACTTTCAGAGCTTCCCCAAGGTGCGG  
 GCCTGGATTGAGAAGACCCTGGAGGAGGGCAGGAGGCGGGGGTACGTGGAGAC  
 CCTCTTCGGCCGCCGCCGCTACGTGCCAGACCTAGAGGCCCGGGTGAAGAGCGT  
 10 GCGGGAGGCGGCCGAGCGCATGGCCTTCAACATGCCCCGTCCAGGGCACCGCCGC  
 CGACCTCATGAAGCTGGCTATGGTGAAGCTCTTCCCCAGGCTGGAGGAAATGGG  
 GGCCAGGATGCTCCTTCAGGTCCACGACGAGCTGGTCCTCGAGGCCCAAAAGA  
 GAGGGCGGAGGCCGTGGCCCGGCTGGCCAAGGAGGTCATGGAGGGGGTGTATCC  
 CCTGGCCGTGCCCCCTGGAGGTGGAGGTGGGGATAGGGGAGGACTGGCTCTCCGC  
 15 CAAGGAGGGCATTGATGGCCGCGGCGGAGGCGGGCATCATCATCATCATTA  
 A

**SEQ ID NO:4 The amino acid sequence of Sso7d-ΔTaq fusion protein**

MITNSSATVKFKYKGEEKEVDISKIKKVWRVGKMISFTYDEGGGKTGRGAVSEKDA  
 20 PKELLQMLEKQKKGGGVTSKALEEAPWPPPEGAFVGFVLSRKEPMWADLLALAA  
 ARGGRVHRAPEPYKALRDLKEARGLLAKDLSVLALREGLGLPPGDDPMLLAYLLDP  
 SNTTPEGVARRYGGEWTEEAGERAAALSERLFANLWGRLEGEERLLWLYREVERPLS  
 AVLAHMEATGVRLDVAYLRALSLEVAEEIARLEAEVFRLAGHPFNLNSRDQLERVLF  
 DELGLPAIGKTEKTGKRSTSAAVLEALREAHPIVEKILQYRELTKLKSTYIDPLPLIH  
 25 PRTGRLHTRFNQTATATGRLSSSDPNLQNIPVRTPLGQRIRRAFIAEEGWLLVALDYS  
 QIELRVLAHLSGDENLIRVFQEGRDIHTETASWMFGVPREAVDPLMRRAAKTINFGV  
 LYGMSAHRLSQELAIPEYEAQAFIERYFQSFQKVRWIEKTLEEGRRRGYVETLFGRR  
 RYVPDLEARVKSVDREAAERMAFNMPVQGTAAADLMKLA MVKLFPRLEEMGARMMLL  
 QVHDEL VLEAPKERA EAVARLAKEVM EGVYPLAVPLEVEVGIGEDWLSAKEGIDGR  
 30 GGGGHHHHHH

**SEQ ID NO:5 The DNA sequence encoding the Sso7d-Taq fusion protein**

ATGATTACGAATTCGAGCGCAACCGTAAAGTTCAAGTACAAAGGCGAAGAAAAA

GAGGTAGACATCTCCAAGATCAAGAAAGTATGGCGTGTGGGCAAGATGATCTCC  
TTCACCTACGACGAGGGCGGTGGCAAGACCGGCCGTGGTGCGGTAAGCGAAAAG  
GACGCGCCGAAGGAGCTGCTGCAGATGCTGGAGAAGCAGAAAAAGGGCGGCGG  
TGTCCTAGTGGGATGCTGCCCCCTCTTTGAGCCCAAGGGCCGGGTCTCCTGGTG  
5 GACGGCCACCACCTGGCCTACCGCACCTTCCACGCCCTGAAGGGCCTCACCACCA  
GCCGGGGGGAGCCGGTGCAGGCGGTCTACGGCTTCGCCAAGAGCCTCCTCAAGG  
CCCTCAAGGAGGACGGGGACGCGGTGATCGTGGTCTTTGACGCCAAGGCCCCCT  
CCTTCCGCCACGAGGCCTACGGGGGGGTACAAGGCGGGCCGGGCCCCCACGCCAG  
AGGACTTTCCCCGGCAACTCGCCCTCATCAAGGAGCTGGTGGACCTCCTGGGGCT  
10 GGCGCGCCTCGAGGTCCCCGGGCTACGAGGCGGACGACGTCCTGGCCAGCCTGGC  
CAAGAAGGCGGAAAAGGAGGGCTACGAGGTCCGCATCCTCACCGCCGACAAAG  
ACCTTTACCAGCTCCTTTCCGACCGCATCCACGTCCTCCACCCCGAGGGGTACCT  
CATCACCCCGGCCTGGCTTTGGGAAAAGTACGGCCTGAGGCCCCGACCAAGTGGGC  
CGACTACCGGGGCCCTGACCGGGGACGAGTCCGACAACCTTCCCGGGGTCAAGGG  
15 CATCGGGGAGAAGACGGCGAGGAAGCTTCTGGAGGAGTGGGGGAGCCTGGAAG  
CCCTCCTCAAGAACCTGGACCGGCTGAAGCCCGCCATCCGGGAGAAGATCCTGG  
CCCACATGGACGATCTGAAGCTCTCCTGGGACCTGGCCAAGGTGCGCACCGACCT  
GCCCCTGGAGGTGGACTTCGCCAAAAGGCGGGAGCCCGACCGGGAGAGGCTTAG  
GGCCTTTCTGGAGAGGCTTGAGTTTGGCAGCCTCCTCCACGAGTTCGGCCTTCTG  
20 GAAAGCCCCAAGGCCTGGAGGAGGCCCCCTGGCCCCCGCCGGAAGGGGCCTTC  
GTGGGCTTTGTGCTTTCCCGCAAGGAGCCCATGTGGGCGGATCTTCTGGCCCTGG  
CCGCCGCCAGGGGGGGCCGGGTCCACCGGGCCCCCGAGCCTTATAAAGCCCTCA  
GGGACCTGAAGGAGGCGCGGGGGCTTCTCGCCAAAGACCTGAGCGTTCTGGCCC  
TGAGGGAAGGCCTTGGCCTCCCGCCCGGCGACGACCCCATGCTCCTCGCCTACCT  
25 CCTGGACCCTTCCAACACCACCCCGAGGGGGTGGCCCCGGCGCTACGGCGGGGA  
GTGGACGGAGGAGGCGGGGGAGCGGGCCGCCCTTCCGAGAGGCTCTTCGCCAA  
CCTGTGGGGGAGGCTTGAGGGGGAGGAGAGGCTCCTTTGGCTTTACCGGGAGGT  
GGAGAGGCCCCCTTCCGCTGTCCTGGCCACATGGAGGCCACGGGGGTGCGCCT  
GGACGTGGCCTATCTCAGGGCCTTGTCCTGGAGGTGGCCGAGGAGATCGCCCG  
30 CCTCGAGGCCGAGGTCTTCCGCTGGCCGGCCACCCCTTCAACCTCAACTCCCGG  
GACCAGCTGGAAAGGGTCCTCTTTGACGAGCTAGGGCTTCCCGCCATCGGCAAG  
ACGGAGAAGACCGGCAAGCGCTCCACCAGCGCCGCGCTCCTGGAGGCCCTCCGC  
GAGGCCCACCCCATCGTGGAGAAGATCCTGCAGTACCGGGAGCTCACCAAGCTG  
AAGAGCACCTACATTGACCCCTTGCCGGACCTCATCCACCCAGGACGGGCGGCC

TCCACACCCGCTTCAACCAGACGGCCACGGCCACGGGCAGGCTAAGTAGCTCCG  
 ATCCCAACCTCCAGAACATCCCCGTCCGCACCCCGCTTGGGCAGAGGATCCGCCC  
 GGCCTTCATCGCCGAGGAGGGGTGGCTATTGGTGGCCCTGGACTATAGCCAGAT  
 AGAGCTCAGGGTGCTGGCCACCTCTCCGGCGACGAGAACCTGATCCGGGTCTTC  
 5 CAGGAGGGGCGGGACATCCACACGGAGACCGCCAGCTGGATGTTTCGGCGTCCCC  
 CGGGAGGGCCGTGGACCCCCTGATGCGCCGGGCGGGCCAAGACCATCAACTTCGGG  
 GTCCTCTACGGCATGTCGGCCCCACCGCCTCTCCCAGGAGCTAGCCATCCCTTACG  
 AGGAGGCCCAGGCCTTCATTGAGCGCTACTTTCAGAGCTTCCCCAAGGTGCGGGG  
 CTGGATTGAGAAGACCCTGGAGGAGGGCAGGAGGCGGGGGTACGTGGAGACCC  
 10 TCTTCGGCCGCCGCGCTACGTGCCAGACCTAGAGGCCCGGGTGAAGAGCGTGC  
 GGGAGGCGGCCGAGCGCATGGCCTTCAACATGCCCGTCCAGGGCACCGCCGCCG  
 ACCTCATGAAGCTGGCTATGGTGAAGCTCTTCCCCAGGCTGGAGGAAATGGGGG  
 CCAGGATGCTCCTTCAGGTCCACGACGAGCTGGTCCTCGAGGCCCCAAAAGAGA  
 GGGCGGAGGCCGTGGCCCGGCTGGCCAAGGAGGTCATGGAGGGGGTGTATCCCC  
 15 TGGCCGTGCCCCTGGAGGTGGAGGTGGGGATAGGGGAGGACTGGCTCTCCGCCA  
 AGGAGGGCATTGATGGCCGCGGCGGAGGCGGGCATCATCATCATCATTA

**SEQ ID NO:6 The amino acid sequence of Sso7d-Taq fusion protein.**

MITNSSATVKFKYKGEEKEVDISKIKKVWRVGKMISFTYDEGGGKTGRGAVSEKDA  
 20 PKELLQMLEKQKKGGGVTSFMLPLFEPKGRVLLVDGHHLAYRTFHALKGLTTSRGE  
 PVQAVYGFASLLKALKEDGDAVIVVFDKAPSFRHEAYGGYKAGRAPTPEDFPRQ  
 LALIKELVDLLGLARLEVPGYEADDVLASLAKKAEKEGYEVRILTADKDLYQLLSDR  
 IHVLHPEGYLITPAWLWEKYGLRPDQWADYRALTGDESDNLPGVKGIGEKTARKLL  
 EEWGSLEALLKNLDRCLKPAIREKILAHMDDLKLSWDLAKVRTDLPLEVDFAKRREP  
 25 DRERLRAFLEFGLSLLHEFGLLESPKALEEAPWPPPEGAFVGFVLSRKEPMWADL  
 LALAAARGGRVHRAPEPYKALRDLKEARGLLAKDLSVLALREGLGLPPGDDPMLLA  
 YLLDPSNTTPEGVARRYGGEWTEEAGERALSERLFANLWGRLEGEERLLWLYREV  
 ERPLSAVLAHMEATGVRLDVAYLRALSLEVAEEIARLEAEVFRLAGHPFNLNSRDQL  
 ERVLFDELGLPAIGKTEKTGKRSTSAVLEALREAHPIVEKILQYRELTKLKSTYIDPL  
 30 PDLIHPRTGRLHTRFNQTATATGRLSSSDPNLQNPVRTPLGQRIRRAFIAEEGWLLVA  
 LDYSQIELRVLAHLSGDENLIRVFQEGRDIHTETASWMFGVPREAVDPLMRRAAKTI  
 NFGVLYGMSAHRLSQELAIPIYEEAQAFIERYFQSFPKVRAWIEKTLEEGRRRGYVETL  
 FGRRRYVPDLEARVKSVREAAERMAFNMPVQGTAAADLMKLAMVKLFPRLEEMGA

RMLLQVHDELVLEAPKERAEAVARLAKEVMEGVYPLAVPLEVEVGIGEDWLSAKE  
GIDGRGGGGHHHHHH

**SEQ ID NO:7 The DNA sequence encoding the Pfu-Sso7d fusion protein**

5 ATGATTTTAGATGTGGATTACATAACTGAAGAAGGAAAACCTGTTATTAGGCTAT  
TCAAAAAAGAGAACGGAAAATTTAAGATAGAGCATGATAGAACTTTTAGACCAT  
ACATTTACGCTCTTCTCAGGGATGATTCAAAGATTGAAGAAGTTAAGAAAATAAC  
GGGGGAAAGGCATGGAAAGATTGTGAGAATTGTTGATGTAGAGAAGGTTGAGAA  
AAAGTTTCTCGGCAAGCCTATTACCGTGTGGAAACTTTATTTGGAACATCCCCAA  
10 GATGTTCCCACTATTAGAGAAAAAGTTAGAGAACATCCAGCAGTTGTGGACATCT  
TCGAATACGATATTCCATTTGCAAAGAGATACCTCATCGACAAAGGCCTAATACC  
AATGGAGGGGGGAAGAAGAGCTAAAGATTCTTGCCTTCGATATAGAAACCCTCTA  
TCACGAAGGAGAAGAGTTTGGAAAAGGCCCAATTATAATGATTAGTTATGCAGA  
TGAAAATGAAGCAAAGGTGATTACTTGGAAAAACATAGATCTTCCATACGTTGA  
15 GGTGTATCAAGCGAGAGAGAGATGATAAAGAGATTTCTCAGGATTATCAGGGA  
GAAGGATCCTGACATTATAGTTACTTATAATGGAGACTCATTGACTTCCCATAT  
TTAGCGAAAAGGGCAGAAAACTTGGGATTAAATTAACCATTGGAAGAGATGGA  
AGCGAGCCCAAGATGCAGAGAATAGGCGATATGACGGCTGTAGAAGTCAAGGG  
AAGAATACATTTGACTTGTATCATGTAATAACAAGGACAATAAATCTCCCAACA  
20 TACACACTAGAGGCTGTATATGAAGCAATTTTTGGAAAGCCAAAGGAGAAGGTA  
TACGCCGACGAGATAGCAAAAGCCTGGGAAAGTGGAGAGAACCTTGAGAGAGTT  
GCCAAATACTCGATGGAAGATGCAAAGGCAACTTATGAACTCGGGAAAGAATTC  
CTTCCAATGGAAATTCAGCTTTCAAGATTAGTTGGACAACCTTTATGGGATGTTT  
CAAGGTCAAGCACAGGGAACCTTGTAGAGTGGTTCTTACTTAGGAAAGCCTACG  
25 AAAGAAACGAAGTAGCTCCAAACAAGCCAAGTGAAGAGGAGTATCAAAGAAGG  
CTCAGGGAGAGCTACACAGGTGGATTTCGTTAAAGAGCCAGAAAAGGGGTTGTGG  
GAAAACATAGTATACCTAGATTTTAGAGCCCTATATCCCTCGATTATAATTACCC  
ACAATGTTTCTCCCGATACTCTAAATCTTGAGGGATGCAAGAACTATGATATCGC  
TCCTCAAGTAGGCCACAAGTTCTGCAAGGACATCCCTGGTTTTATACCAAGTCTC  
30 TTGGGACATTTGTTAGAGGAAAGACAAAAGATTAAGACAAAAATGAAGGAAACT  
CAAGATCCTATAGAAAAAATACTCCTTGACTATAGACAAAAAGCGATAAACTC  
TTAGCAAATTCTTTCTACGGATATTATGGCTATGCAAAAGCAAGATGGTACTGTA  
AGGAGTGTGCTGAGAGCGTTACTGCCTGGGGAAGAAAGTACATCGAGTTAGTAT  
GGAAGGAGCTCGAAGAAAAGTTTGGATTAAAGTCCTCTACATTGACACTGATG

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GTCTCTATGCAACTATCCCAGGAGGAGAAAGTGAGGAAATAAAGAAAAAGGCTC  
 TAGAATTTGTAAAATACATAAATTCAAAGCTCCCTGGACTGCTAGAGCTTGAATA  
 TGAAGGGTTTTATAAGAGGGGATTCTTCGTTACGAAGAAGAGGTATGCAGTAAT  
 AGATGAAGAAGGAAAAGTCATTACTCGTGGTTTAGAGATAGTTAGGAGAGATTG  
 5 GAGTGAAATTGCAAAAGAACTCAAGCTAGAGTTTTGGAGACAATACTAAAACA  
 CGGAGATGTTGAAGAAGCTGTGAGAATAGTAAAAGAAGTAATACAAAAGCTTGC  
 CAATTATGAAATTCCACCAGAGAAGCTCGCAATATATGAGCAGATAACAAGACC  
 ATTACATGAGTATAAGGCGATAGGTCCTCACGTAGCTGTTGCAAAGAACTAGCT  
 GCTAAAGGAGTTAAAATAAAGCCAGGAATGGTAATTGGATACATAGTACTTAGA  
 10 GGCGATGGTCCAATTAGCAATAGGGCAATTCTAGCTGAGGAATACGATCCCAA  
 AAGCACAAGTATGACGCAGAATATTACATTGAGAACCAGGTTCTTCCAGCGGTA  
 CTTAGGATATTGGAGGGATTTGGATACAGAAAGGAAGACCTCAGATACCAAAAG  
 ACAAGACAAGTCGGCCTAACTTCCTGGCTTAACATTAATAAAAAATCCGGTACCGGC  
 GGTGGCGGTGCAACCGTAAAGTTCAAGTACAAAGGCGAAGAAAAAGAGGTAGA  
 15 CATCTCCAAGATCAAGAAAGTATGGCGTGTGGGCAAGATGATCTCCTTCACCTAC  
 GACGAGGGCGGTGGCAAGACCGGCCGTGGTGCGGTAAGCGAAAAGGACGCGCC  
 GAAGGAGCTGCTGCAGATGCTGGAGAAGCAGAAAAAGTGA

**SEQ ID NO:8 The amino acid sequence of the Pfu-Sso7d fusion protein**

20 MILDVDYITEEGKPVIRLFKKENGKFKIEHRTFRPYIYALLRDDSKIEEVKKITGERH  
 GKIVRIVDVEKVEKKFLGKPITVWKLYLEHPQDVPTIREKVREHPAVVDIFEYDIPFA  
 KRYLIDKGLIPMEGEEELKILAFDIETLYHEGEEFGKGPIIMISYADENEAKVITWKNID  
 LPYVEVVSSEREMIKRFLRIIREKDPDIIVTYNGDSFDFPYLAKRAEKLGIKLTIGRDGS  
 EPKMQRIGDMTAVEVKGRIHFDLYHVITRTINLPTYTLEAVYEAIFGKPKKVKYADEI  
 25 AKAWESGENLERVAKYSMEDAKATYELGKEFLPMEIQLSRLVGQPLWDVSRSTGN  
 LVEWFLLRKAYERNEVAPNKPSEEEYQRRLRESYTGGFVKEPEKGLWENIVYLDFR  
 ALYPSIIITHNVSPDTLNLEGCKNYDIAPQVGHKFCCKDIPGFIPSLLGHLLEERQKIKTK  
 MKETQDPIEKILLDYRQKAIKLLANSFYGYGYAKARWYCKECAESVTAWGRKYIE  
 LVWKELEEKFGFKVLYIDTDGLYATIPGGESEIKKKALEFVKYINSKLPGLLELEYE  
 30 GFYKRGFFVTKKRYAVIDEEGKVITRGLIVRRDWSEIAKETQARVLETILKHGDVEE  
 AVRIVKEVIQKLANYEIPPEKLAIYEQITRPLHEYKAIGPHVAVAKKLAAGVKIKPG  
 MVIGYIVLRGDGPISNRAILAEYDPKKHKYDAEYYIENQVLPVLRILEGFGYRKED  
 LRYQKTRQVGLTSWLNKKSGTGGGGATVKFKYKGEEKEVDISKIKKVWRVGMIS  
 FTYDEGGGKTGRGAVSEKDAPKELLQMLEKQKK

**SEQ ID NO:9 The DNA sequence encoding the Sac7d-ΔTaq fusion protein**

ATGATTACGAATTCGACGGTGAAGGTAAAGTTCAAGTATAAGGGTGAAGAGAAA  
GAAGTAGACACTTCAAAGATAAAGAAGGTTTGGAGAGTAGGCCAAAATGGTGTCC  
5 TTTACCTATGACGACAATGGTAAGACAGGTAGAGGAGCTGTAAGCGAGAAAGAT  
GCTCCAAAAGAATTATTAGACATGTTAGCAAGAGCAGAAAGAGAGAAGAAAGG  
CGGCGGTGTCACTAGTCCCAAGGCCCTGGAGGAGGCCCCCTGGCCCCCGCCGGA  
AGGGGCCTTCGTGGGCTTTGTGCTTTCCCGCAAGGAGCCCATGTGGGGCCGATCTT  
CTGGCCCTGGCCGCCGCCAGGGGGGGCCGGGTCCACCGGGCCCCCGAGCCTTAT  
10 AAAGCCCTCAGGGACCTGAAGGAGGCGCGGGGGCTTCTCGCCAAAGACCTGAGC  
GTTCTGGCCCTGAGGGAAGGCCTTGGCCTCCCGCCCGGCGACGACCCCATGCTCC  
TCGCCTACCTCCTGGACCCTTCCAACACCACCCCGAGGGGGTGGCCCGGCGCTA  
CGGCGGGGAGTGGACGGAGGAGGCGGGGGAGCGGGCCGCCCTTTCCGAGAGGC  
TCTTCGCCAACCTGTGGGGGAGGCTTGAGGGGGAGGAGAGGCTCCTTTGGCTTTA  
15 CCGGGAGGTGGAGAGGCCCCCTTTCCGCTGTCCTGGCCACATGGAGGCCACGGG  
GGTGCCTTGGACGTGGCCTATCTCAGGGCCTTGTCCCTGGAGGTGGCCGAGGA  
GATCGCCCGCCTCGAGGCCGGGTCTTCCGCCTGGCCGGCCACCCCTTCAACCTCA  
ACTCCCGGGACCAGCTGGAAAGGGTCCTCTTTGACGAGCTAGGGCTTCCCGCCAT  
CGGCAAGACGGAGAAGACCGGCAAGCGCTCCACCAGCGCCGCGCTCCTGGAGGC  
20 CCTCCGCGAGGCCACCCCATCGTGGAGAAGATCCTGCAGTACCGGGAGCTCAC  
CAAGCTGAAGAGCACCTACATTGACCCCTTGCCGGACCTCATCCACCCAGGACG  
GGCCGCTCCACACCCGCTTCAACCAGACGGCCACGGCCACGGGCAGGCTAAGT  
AGCTCCGATCCCAACCTCCAGAACATCCCCGTCCGCACCCCGCTTGGGCAGAGGA  
TCCGCCGGGCCTTCATCGCCGAGGAGGGGTGGCTATTGGTGGCCCTGGACTATAG  
25 CCAGATAGAGCTCAGGGTGCTGGCCACCTCTCCGGCGACGAGAACCTGATCCG  
GGTCTTCCAGGAGGGGGCGGGACATCCACACGGAGACCGCCAGCTGGATGTTCCG  
CGTCCCCCGGGAGGCCGTGGACCCCTGATGCGCCGGGCGGCCAAGACCATCAA  
CTTCGGGGTCTCTACGGCATGTGCGGCCACCGCCTCTCCCAGGAGCTAGCCATC  
CCTTACGAGGAGGCCAGGCCTTCATTGAGCGCTACTTTCAGAGCTTCCCCAAGG  
30 TGCGGGCCTGGATTGAGAAGACCCTGGAGGAGGGCAGGAGGCGGGGGTACGTG  
GAGACCCTCTTCGGCCGCCGCCGCTACGTGCCAGACCTAGAGGCCCGGGTGAAG  
AGCGTGCGGGAGGCGGCCGAGCGCATGGCCTTCAACATGCCCCGTCCAGGGCACC  
GCCGCCGACCTCATGAAGCTGGCTATGGTGAAGCTTCCCCAGGCTGGAGGAA

ATGGGGGCCAGGATGCTCCTTCAGGTCCACGACGAGCTGGTCCTCGAGGCCCA  
 AAAGAGAGGGCGGAGGCCGTGGCCCGGCTGGCCAAGGAGGTCATGGAGGGGGT  
 GTATCCCCTGGCCGTGCCCCTGGAGGTGGAGGTGGGGATAGGGGAGGACTGGCT  
 CTCCGCCAAGGAGGGCATTGATGGCCGCGGCGGAGGCGGGCATCATCATCA  
 5 TCATTAA

**SEQ ID NO:10 The amino acid sequence of the Sac7d-ΔTaq fusion protein**

MITNSTVKVKFKYKGEEKEVDTSKIKKVWRVGMVSFTYDDNGKTGRGAVSEKDA  
 PKELLDMLARAEREKKGGGVTSKALEEAPWPPPEGAFVGFVLSRKEPMWADLLAL  
 10 AAARGGRVHRAPEPYKALRDLKEARGLLAKDLSVLALREGLGLPPGDDPMLLAYLL  
 DPSNTTPEGVARRYGGEWTEEAGERAAALSERLFANLWGRLEGEERLLWLYREVERP  
 LSAVLAHMEATGVRLDVAYLRALSLEVAEEIARLEAEVFRLAGHPFNLNSRDQLERV  
 LFDELGLPAIGKTEKTGKRSTSAAVLEALREAHPIVEKILQYRELTKLKSTYIDPLPDLI  
 HPRTGRLHTRFNQTATATGRLSSSDPNLQNIPTVPLGQRIRRAFIAEEGWLLVALDY  
 15 SQIELRVLAHLSGDENLIRVFQEGRDIHTETASWMFGVPREAVDPLMRRAAKTINFG  
 VLYGMSAHRLSQELAIPEYEAQAFIERYFQSFPKVRAWIEKTLEEGRRRGYVETLFR  
 RRYVPDLEARVKSAREMAFNMPVQGTAAADLMKLMVCLFPRLEEMGARM  
 LQVHDELVLEAPKERAEEAVARLAKEVMIEGVYPLAVPLEVEVGIGEDWLSAKEGIDG  
 RGGGGHHHHHHH  
 20

**SEQ ID NO:11 The DNA sequence encoding the PL-ΔTaq fusion protein**

ATGATTACGAATTCGAAGAAAAAGAAAAAGAAAAAGCGTAAGAAACGCAAAAA  
 GAAAAAGAAAGGCGGCGGTGTCACTAGTGGCGCAACCGTAAAGTTCAAGTACAA  
 AGGCGAAGAAAAAGAGGTAGACATCTCCAAGATCAAGAAAGTATGGCGTGTGG  
 25 GCAAGATGATCTCCTTCACCTACGACGAGGGCGGTGGCAAGACCGGCCGTGGTG  
 CGGTAAGCGAAAAGGACGCGCCGAAGGAGCTGCTGCAGATGCTGGAGAAGCAG  
 AAAAAGGGCGGCGGTGTCAACAGTCCCAAGGCCCTGGAGGAGGCCCCCTGGCCC  
 CCGCCGGAAGGGGCCTTCGTGGGCTTTGTGCTTTCCCGCAAGGAGCCCATGTGGG  
 CCGATCTTCTGGCCCTGGCCGCCGCGCAGGGGGGGCCGGGTCCACCGGGCCCCCG  
 30 AGCCTTATAAAGCCCTCAGGGACCTGAAGGAGGCGCGGGGGCTTCTCGCCAAAG  
 ACCTGAGCGTTCTGGCCCTGAGGGAAGGCCTTGGCCTCCCGCCCGGCGACGACCC  
 CATGCTCCTCGCCTACCTCCTGGACCCTTCCAACACCACCCCGAGGGGGTGGCC  
 CGGCGCTACGGCGGGGAGTGGACGGAGGAGGCGGGGGAGCGGGCCGCCCTTCC

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GAGAGGCTCTTCGCCAACCTGTGGGGGAGGCTTGAGGGGGAGGAGAGGCTCCTT  
 TGGCTTTACCGGGAGGTGGAGAGGCCCCTTTCCGCTGTCCTGGCCCACATGGAGG  
 CCACGGGGGTGCGCCTGGACGTGGCCTATCTCAGGGCCTTGTCCTGGAGGTGGC  
 CGAGGAGATCGCCCGCCTCGAGGCCGAGGTCTTCCGCCTGGCCGGCCACCCCTTC  
 5 AACCTCAACTCCCGGGACCAGCTGGAAAGGGTCCTCTTTGACGAGCTAGGGCTTC  
 CCGCCATCGGCAAGACGGAGAAGACCGGCAAGCGCTCCACCAGCGCCGCCGTCC  
 TGGAGGCCCTCCGCGAGGCCACCCCATCGTGGAGAAGATCCTGCAGTACCGGG  
 AGCTACCAAGCTGAAGAGCACCTACATTGACCCCTTGCCGGACCTCATCCACCC  
 CAGGACGGGGCCGCCTCCACACCCGCTTCAACCAGACGGCCACGGCCACGGGCAG  
 10 GCTAAGTAGCTCCGATCCCAACCTCCAGAACATCCCCGTCCGCACCCCGCTTGGG  
 CAGAGGATCCGCCGGGCCTTCATCGCCGAGGAGGGGTGGCTATTGGTGGCCCTG  
 GACTATAGCCAGATAGAGCTCAGGGTGCTGGCCACCTCTCCGGCGACGAGAAC  
 CTGATCCGGGTCTTCCAGGAGGGGGCGGGACATCCACACGGAGACCGCCAGCTGG  
 ATGTTTCGGCGTCCCCCGGGAGGCCGTGGACCCCTGATGCGCCGGGCGGCCAAG  
 15 ACCATCAACTTCGGGGTCCTCTACGGCATGTCGGCCACCGCCTCTCCCAGGAGC  
 TAGCCATCCCTTACGAGGAGGCCCAGGCCTTCATTGAGCGCTACTTTCAGAGCTT  
 CCCCAGGTGCGGGCCTGGATTGAGAAGACCCTGGAGGAGGGCAGGAGGCGGG  
 GGTACGTGGAGACCCTCTTCGGCCGCCGCGCTACGTGCCAGACCTAGAGGCC  
 GGGTGAAGAGCGTGCGGGAGGCGGCCGAGCGCATGGCCTTCAACATGCCCGTCC  
 20 AGGGCACCGCCGCCGACCTCATGAAGCTGGCTATGGTGAAGCTCTTCCCCAGGCT  
 GGAGGAAATGGGGGCCAGGATGCTCCTTCAGGTCCACGACGAGCTGGTCCTCGA  
 GGCCCCAAAAGAGAGGGCGGAGGCCGTGGCCCGGCTGGCCAAGGAGGTCATGG  
 AGGGGGTGTATCCCCTGGCCGTGCCCCTGGAGGTGGAGGTGGGGATAGGGGAGG  
 ACTGGCTCTCCGCCAAGGAGGGCATTGATGGCCGCGGCGGAGGCGGGCATCATC  
 25 ATCATCATCATTA

**SEQ ID NO:12 The amino acid sequence of PL-ΔTaq fusion protein**

MITNSKKKKKKRKKRKKKKKGGGVTS GATVKFKYKGEEKEVDISKIKKVWRVGK  
 MISFTYDEGGGKTGRGAVSEKDAPKELLQMLEKQKKG GVTSPKALEEAPWPPPEG  
 30 AFVGFVLSRKEPMWADLLALAAARGRVHRAPEPYKALRDLKEARGLLAKDLSVL  
 ALREGLGLPPGDDPMLLAYLLDPSNTTPEGVARRYGGEWTEEAGERAA LSERLFAN  
 LWGRLEGEERLLWLYREVERPLSAVLAHMEATGVRLDVAYLRALSLEVAEEIARLE  
 AEVFRLAGHPFNLNSRDQLERVLFDELGLPAIGKTEKTGKRSTSAAVLEALREAHPIV

EKILQYRELTKLKSTYIDPLPDLIHPRTGRLHTRFNQTATATGRLSSSDPNLQNIPVRTP  
 LGQRIRRAFIAEEGWLLVALDYSQIELRVLAHLSGDENLIRVFQEGRDIHTETASWMF  
 GVPREAVDPLMRRAAKTINFGVLYGMSAHRLSQELAIPIYEEAQAFIERYFQSFPKVR  
 AWIEKTLEEGRRRGYVETLFGRRRYVPDLEARVKSVREAAERMAFNMPVQGTAAAD  
 5 LMKLAMVKLFPRL EEMGARMLLQVHDELVLEAPKERA EAVARLAKEVM EGVYPL  
 AVPLEVEVGIGEDWLSAKEGIDGRGGGGHHHHHH

**SEQ ID NO:13 PRIMER L71F**

5'-CCTGCTCTGCCGCTTCACGC-3'

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**SEQ ID NO:14 PRIMER L71R**

5'-GCACAGCGGCTGGCTGAGGA-3'

**SEQ ID NO:15 PRIMER L18015F**

15 5'-TGACGGAGGATAACGCCAGCAG-3'

**SEQ ID NO:16 PRIMER L23474R**

5'-GAAAGACGA TGGGTCGCTAATACGC-3'

**SEQ ID NO:17 PRIMER L18015F**

20 5'-TGACGGAGGATAAC GCCAGCAG-3'

**SEQ ID NO:18 PRIMER L29930R**

5'-GGGGTTGGAGGTCAATGGGTTC-3'

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**SEQ ID NO:19 PRIMER L30350F**

5'-CCTGCTCTGCCGCTTCACGC-3'

**SEQ ID NO:20 PRIMER L35121R**

30 5'-CACATGGTACAGCAAGCCTGGC-3'

**SEQ ID NO:21 PRIMER L2089F**

5'-CCCGTATCTGCTGGGA TACTGGC-3

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**SEQ ID NO: 22 PRIMER L7112R**

5'-CAGCGGTGCTGACTGAATCATGG-3'

**SEQ ID NO:23 PRIMER L30350F**

5 5'-CCTGCCTGCCGCTTCACGC-3'

**SEQ ID NO:24 PRIMER L40547R**

5'-CCAATACCCGTTTCA TCGCGGC-3'

10 **SEQ ID NO:25 PRIMER H-Amelo-Y**

5'-CCACCTCATCCTGG GCACC-3'

**SEQ ID NO:26 PRIMER H-Amelo-YR**

5'-GCTTGAGGCCAACCATCAGAGC-3'

**SEQ ID NO:27 Human beta-globin primer 536F**

5'-GGTTGGCCAATCTACTCCCAGG-3'

**SEQ ID NO:28 Human beta-globin primer 536R**

5'-GCTCACTCAGTGTGGCAAAG-3'

**SEQ ID NO:29 Human beta-globin primer 1408R**

5'-GATTAGCAAAAGGGCCTAGCTTGG-3'

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